CASE STUDY

Three storey office building in Singapore

thermo emulsion | Insulation… in a tin.

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We ran the data through our simulation programme using a 3 storey office building in Singapore as the subject.

(Weather and Solar data was based on a Singapore database)

We kept all things constant and only changed the **absorptivity** values for the **walls**.

We did not simulate a central plant but only Rooftop Packaged Units.

The result :

5% reduction in kWh for Space Cooling Load

3% reduction in kWh for Interior Fans

If we had used a central plant, then there would be **potential** savings in the region of **2-4%** from reduction in pump, chiller and cooling tower sizes.

Also , we did not change the U value as we realised that the impact is very minimal as the coating thickness is only 0.55mm.

So, all in all a **10-12% reduction in cooling costs**.

On top of that, there would be a potential **capital cost savings of about 5%** on Air-Conditioning equipment and piping because the cooling load is reduced by 5%.

Based on the laboratory test report, thermal conductivity (k-value) of **Nutshell's Thermo Emulsion** is very low (0.1292W/m.K). A very low k value indicates a good conductive insulator. But the U-value (Conductance) depends on thickness and the thickness (L) of the **Thermo Emulsion** (0.55mm) is so small that the U-value is not given serious consideration.

What really counts in preventing heat transfer is **solar reflectivity**. U value or its reciprocal R-value (resistance) is only valid when "managing" heat which has already transferred.

To compare **Thermo Emulsion** thermal resistance (R-value) to the thermal resistance of polystyrene or of fiberglass, is to compare materials acting on different heat transfer modes (radiation vs. conduction).

There is no common ground between radiation and conduction **except the calculation of the end results**

(actual heat transfer) in terms of W/m2 or Btu/hr/ft2.

The reflectivity and emissivity of most wall/roof surfaces is extremely low (less than 0.20) when compared with **Thermo Emulsion** high solar reflectivity (p-value: 0.9235) and thermal emissivity.

Therefore, to avoid heat transfer, the best way is to reflect radiant heat (stop the heat from coming in

the wall/roof to begin with) and to quickly emit any radiation that is absorbed.

In dealing with radiation, thickness has no useful value and R-values or k-values are not useful anymore. High reflectivity and emissivity become important.

If, on the other hand, you don't effectively deal with heat transfer by radiation, you will then be stuck and forced to deal with heat transfer by conduction once heat penetrates the roof; then, R-value which is directly proportional to thickness, becomes an important factor.

The comparison of a structure with **Thermo Emulsion** wall & roofing system purely on the basis of conduction factors (thickness, k-value, density, heat resistance) is counter-productive. Such a comparison does not do justice to the end-users.

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